CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory
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NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/AIV/2014-15 11.02.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	11.02.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	390	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	309	309	
4	Aggregate Impact value = percent fines	20.57	20.77	
	100* (W_2/W_1)%			**20.67**

Civil-Tech Consultants & Engineers Bangalore

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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AE W.12

ಸಹಾಯಕ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು
ಶೆಟ್ಟಿಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
ಜಿಸ್.ಎಂ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು

M/s. Civil-Tech Consultants & Engineers
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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	11.02.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	392	393	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	304	304	
4	Aggregate Impact value = percent fines	22.45	22.65	
	100* (W_2/W_1)%			22.55

Civil-Tech Consultants & Engineers Bangalore

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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AE W.12

11/2

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	11.02.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	390	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	303	
4	Aggregate Impact value = percent fines	22.56	22.70	
	100* (W_2/W_1)%			**22.63**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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ಪ್ಲಾಟ್ ನಂ. ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು

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Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/S-T/2014-15 12.02.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.02.2015

Result : Flakiness Index = **11.56%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index 24.81%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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W.12
12/2

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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ಮುನಿ ಡಿಪ್ಪೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು

Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/S-T/2014-15 12.02.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.02.2015

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.35%**

Elongation Index = **13.10%**

Result : Combined Flakiness & Elongation index 25.45%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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W.12

12/2

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Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/S-T/2014-15 12.02.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.02.2015

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.85%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **25.10%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.12/KRIDL/WMM/S-T/2014-15 12.02.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.02.2015

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.85%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **25.10%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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AE W.12 12/2

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QUALITY CONTROL REPORTS FOR

BITUMINOUS MACADAM

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NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.12/KRIDL/CSR-01/752c/QB(BM)/2014-15 09.03.2015

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
*AGENCY	:	**Technical Manager (West),** KRIDL, Bangalore.
*NAME OF THE WORK	:	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
REFERENCE	:	EE/DD/WO/46/2014-15 Dated: 25.06.2014
*SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	07.03.2015
DARE OF TESTING	:	09.03.2015

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	86	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	45	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	296	Min. 220

*Information is furnished by the Customer/Representative.

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VISHWANATH .C
Quality Manager

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Job No: CTCE/BBMP/W.No.12/KRIDL/BM/AIV/2014-15 09.03.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Bituminous Macadam
Date of Testing	09.03.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	302	
4	Aggregate Impact value = percent fines	21.76	21.96	
	100* (W_2/W_1)%			21.86

Civil-Tech Consultants & Engineers ★ Bangalore

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Macadam is 30%

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EE W.12 9/3

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
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Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Bituminous Macadam
Date of Testing	09.03.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	390	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines	22.62	22.82	
	100* (W_2/W_1)%			22.72

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Comments:

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AE W.12 9/3

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Job No: CTCE/BBMP/W.No.12/KRIDL/BM/Shape.T/2014-15 : 09.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	: EE/DD/WO/46/2014-15 Dated: 25.06.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Bituminious Macadum
Date of Testing	: 09.03.2015

Civil-Tech Consultants & Engineers Bangalore

Flakiness Index = **11.09%**

Elongation Index = **13.58%**

Result : Combined Flakiness & Elongation index **24.67%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Macadam is 30%

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AE W.12 9/3

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಶೆಟ್ಟಿಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
ಎಸ್.ಎಂ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು

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Job No: CTCE/BBMP/W.No.12/KRIDL/BM/Shape.T/2014-15 : 09.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, Bangalore.
Name of Work	: Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	: EE/DD/WO/46/2014-15 Dated: 25.06.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Bituminious Macadum
Date of Testing	: 09.03.2015

Flakiness Index = **12.35%**

Elongation Index = **13.10%**

Result : Combined Flakiness & Elongation index **25.45%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Macadam is 30%

Note:

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Job No: CTCE/BBMP/W.No.12/KRIDL/BM/Stripping/2014-15

11.03.2015

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Type of Mix	Bituminous Macadam
Date of Testing	11.03.2015

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.4	3.30	96.70
2	3.3		
3	3.2		

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Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Macadam is 95%

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ಪಿಡಬ್ಲ್ಯೂಡಿ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು

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Job No: CTCE/BBMP/W.No.12/KRIDL/BM/Sp_Wa/2014-15

11.03.2015

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements to Main & Cross Road at Kodandaramaswamy temple back side area & Kammagondanahalli in Ward No.12, BBMP, Bangalore.
Reference	EE/DD/WO/46/2014-15 Dated: 25.06.2014
Source / Location	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	11.03.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 2	
1	Weight of aggregate suspended in water with the basket	W_1 g	2007	2008	2009	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1257	1258	1259	
4	Weight of saturated surface dry aggregate in air	W_3 g	2017	2018	2019	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	760	760	760	
6	Weight of oven dried aggregate	W_4 g	2003	2004	2005	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.636	2.637	2.638	2.637
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.685	2.686	2.688	2.686
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.70%	0.70%	0.70%	0.70%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Macadam is 2.0%

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